

**CLAIMS:**

- 5 1. An oxidizer package for use in solid fuel propellant system, said oxidizer package comprising a solid oxidizer in the form of discrete pellets of a pre-determined geometric shape, said pellets being arranged in an array with spaces amongst said pellets and a holder for maintaining said pellets in said array for receipt of a binder introduced to spaces amongst said array of pellets.
- 10 2. An oxidizer package of claim 1 wherein said pellets are pressed from an oxidizer composition.
- 15 3. An oxidizer package of claim 1 wherein said oxidizer composition comprises an oxidizer selected from the group consisting of hydroxylammonium nitrate, ammonium perchlorate, ammonium nitrate, , hydroxylammonium perchlorate, nitronium perchlorate, hydrazinium nitroformate and ammonium dinitramide.
- 20 4. An oxidizer package of claim 3 wherein the composition additionally comprises modifiers and/or fuel additives.
- 25 5. An oxidizer package of claim 1 wherein said holder for said array of pellets is a container for holding said pellets in the array until a binder is introduced to spaces amongst said pellets.
- 30 6. An oxidizer package of claim 1 wherein said holder for said array of pellets is a flexible open mesh having adhesive surfaces for sticking to said pellets, said mesh being wrapped about said pellets to hold said pellets in said array until a binder is introduced to spaces amongst said pellets through said open mesh.
7. A solid fuel propellant system comprising pellets of a solid oxidizer, said pellets having a predetermined geometric shape and being arranged in an array with spaces amongst said pellets, a binder introduced to said spaces

amongst said pellets for provide a support matrix for said pellets, said binder being of a selected material to provide complementary burn rates for said pellets and said support binder matrix.

5 8. A solid fuel propellant system of claim 7, wherein said pellets are pressed from an oxidizer composition.

9. A solid fuel propellant system of claim 8, wherein said oxidizer composition comprises an oxidizer selected from the group consisting of  
10 hydroxylammonium nitrate, ammonium perchlorate, ammonium nitrate, hydroxylammonium perchlorate, nitronium perchlorate, hydrazinium nitroformate and ammonium dinitramide.

10. A solid fuel propellant system of claim 9, wherein the composition  
15 additionally comprises modifiers and/or fuel additives.

11. A solid fuel propellant system of claim 8, wherein said composition contains ultrafine aluminum.

20 12. A solid fuel propellant system of Claim 7 in which a portion of the propellant system is separated from another portion by an inhibitor layer.

13. The propellant system of Claim 12 in which the portions are in the shape of a right section of a cylinder.

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14. The propellant system of Claim 13 in which said right cylinder is divided into more than one section.

15. The propellant system of Claim 14 in which said sections are selected  
30 from semi-circles, tri-sections and quadrants.

16. The propellant system of Claim 14 in which the portions of the propellant have a circular cross-section with parallel planar opposing ends.

17. The propellant system of Claim 7 in which the pellets are in the form of at least one of spheres, capsules, rods and tubes.
18. The propellant system, of Claim 7 in which the binder is selected from the group consisting of a thermoplastic polymer, a thermoset polymer, waxes or greases, an energetic polymer and a polymerized peroxide.
19. The propellant system, of Claim 7 in which the binder is composite propellant or gas generator composition, or a double-base propellant.
20. A solid fuel propellant system of claim 9, wherein said oxidizer is hydrazinium nitroformate.
21. A solid fuel propellant system of claim 9, wherein said oxidizer is ammonium dinitramide.
22. A solid fuel propellant system of claim 7, wherein said propellant system is for a rocket.
23. A method of making a solid fuel propellant system for solid pellets of oxidizer having a predetermined geometrical shape, comprising:
  - i) introducing a binder amongst said oxidizer pellets arranged in an array, and
  - ii) allowing said binder to set to support said pellets in a binder matrix.
24. A method of claim 23 comprising the additional step of arranging said pellets in an array of predetermined arrangement.
25. A method of claim 23 wherein said binder is poured onto said array of pellets and is allowed to flow into spaces amongst said array of pellets.
26. A method of claim 23 wherein said binder is injected into spaces amongst said array of pellets.

27. A method of claim 23 wherein said pellets are mixed into said binder to provide thereby a random array of pellets in said binder.

28. A method of claim 27 wherein a sufficient amount of pellets are mixed  
5 with said binder to provide an array spacing between pellets of less than  
about 50 microns.

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